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IN THE

Supreme Court of the United States

OCTOBER TERM, 1980

WILLARD R. CUSTER AND
CUSTER CHANNEL WING CORPORATION,
Petitioners,

v.

UNITED STATES OF AMERICA,
Respondent.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF CLAIMS

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QUESTIONS PRESENTED

1. Whether the Court of Claims, in granting summary judgment on Patents Nos. 3,650,497 and 3,704,842, erroneously found noninfringement as a matter of law through an unwarranted reliance upon the affidavits submitted by defendant.

2. Whether the Court of Claims erroneously refused to apply the tolling provisions of 35 USC Section 286 where a written claim for compensation was made by petitioner.

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WILLARD R. CUSTER and CUSTER
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Petitioners

vs.

UNITED STATES OF AMERICA

Respondent.

PETITION FOR A WRIT OF CERTIORARI TO
THE UNITED STATES COURT OF CLAIMS

Willard R. Custer and Custer Channel Wing Corporation, petitioners, pray that a writ of certiorari issue to review the judgment of the United States Court of Claims entered in the above case on May 14, 1980.

OPINIONS BELOW

The per curiam opinion of the Court of Claims adopting the opinion of the trial judge is unreported and is appended to this petition as Appendix A.

JURISDICTION

The judgment of the United States Court of Claims was entered on May 14, 1980. The jurisdiction of this court is invoked under 28 USC Section 1255(1).

QUESTIONS PRESENTED

1. Whether the Court of Claims, in granting summary judgment on Patents Nos. 3,650,497 and 3,704,842, erroneously found noninfringement as a matter of law through an unwarranted reliance upon the affidavits submitted by defendant.

2. Whether the Court of Claims erroneously refused to apply the tolling provisions of 35 USC Section 286 where a written claim for compensation was made by petitioner.

STATUTES, FEDERAL RULES AND REGULATIONS INVOLVED

The texts of 35 USC Section 286, 28 USC Section 2501 and Court of Claimns Rule 101 are set forth in full in Appendix B.

STATEMENT OF THE CASE

This case arises from a petition filed in the Court of Claims on April 27, 1978, and later amended, seeking compensation under 28 USC Section 1498(a) for the use by or for the United States without license of an invention described in the claims of certain United States patents. The patents in question are United States Patent No. 3,650,497 issued March 21, 1972 for "jet propelled channelled aircraft;" (hereinafter the '497 patent) United States Patent No. 3,704,842, issued December 4, 1972 for "contoured stack of jet engine with channel wing aircraft" (hereinafter the '842 patent); and United States Patent No. 2,687,262, issued August 24,

1954 for "jet propelled channelled aircraft" (hereinafter the '262 patent). The alleged infringing equipment is the A-10 aircraft, procured under contract no. F33657-73-C-0500, awarded to Fairchild Industries, Inc., by the United States Air Force effective date January 1, 1973. On August 9, 1978, the United States filed an answer to the petition, together with a motion for summary judgment and supporting brief. The basis for the motion was that the claims of Patents Nos. 3,650,497 and 3,704,842 were not infringed by the A-10 aircraft and that recovery for possible infringement of Patent No. 2,687,262 is barred by the statute of limitations. After an amended petition was filed by leave of court, a supplemental motion for summary judgment was filed.

The defendant's motion and supplemental motion rested upon the patents in suit,,the file wrapper representing the prosecution history of the

patents in question and affidavits of Urban A. Hinders, the Chief Engineer of the Air Force A-10 program office. Mr. Hinders' affidavits made certain factual assertions concerning the structure of the A-10 and drew certain conclusions concerning the relation of the claims of patents in question upon the A-10. Petitioners submitted in response an affidavit of Willard R. Custer, the inventor of the patents in suit which similarly contained conclusions upon the reading of the claims upon the accused device.
Because of the length of these affidavits, relevant portions are set forth in Appendix C to this petition.

The patents in suit relate to improved methods for generating lift in aircraft by use of open lift channels. The following facts, basic to an understanding of the patents in question, were undisputed: Aircraft achieve lift through the reduction

of pressure upon the upper surface of the wing, or airfoil. This reduction of pressure is generated when the velocity of air or gas moving over the upper surface of the wing or other surface exceeds the velocity of air passing under the wing. In conventional aircraft, the difference in velocities is caused by the airfoil shape of the wing and the flow of air is caused by the movement of the aircraft; due to the shape of the airfoil, the air moving over the upper surface flows at a higher velocity. Thus, if the wing is not moving, no flow exists and no lift is generated.

Open lift channels, as disclosed by the Custer patents are structural arrangements by which the flow of gas or air across an airfoil surface such as a wing is induced. These channels, which assume a variety of configurations in the various patents, basically are composed of an upwardly

open lifting surface placed in such relation to a source of flow (such as the exhaust of a jet engine) as to cause a flow of air across the wing even when motion relative to the ground is slight or nonexistent. In consequence, such channels have the potential of generating lift when the aircraft is not moving, or increasing lift when the aircraft is moving at low speeds.

The case was referred to Trial Judge Francis C. Browne who filed an opinion and recommended decision on August 21, 1979. This opinion was adopted by the Court of Claims after consideration of a petition for review filed by petitioners.

The claims of the '842 and '497 patents are set forth in full in the opinion of the Court of Claims. With respect to each of these patents, the court found that substantial limitations existed upon the scope

of the claims because of file wrapper estoppel. The court then ruled that the claims, as limited, did not read upon the A-10, relying upon its examination of the accused structure and the assertions of defendant's expert.

The third patent in suit, No. 2,687,262, expired on August 24, 1971, more than six years prior to the filing of the petition; the defendant contended that any possible recovery under the '262 patent was barred by the statute of limitations contained in 28 U.S.C. Section 2501 and 35 U.S.C. section 286. Petitioners opposed this contention on the ground that the filing of an administrative claim for compensation with the Air Force on December 21, 1976 had, under 35 USC Section 286, tolled the running of limitations for a sufficient period in which to obtain recovery under patent '262. The Court of Claims concluded that the

administrative claim, because it did not expressly mention this patent, failed to toll the statute of limitations and granted the defendant's motion for summary judgment with respect to the '262 patent. (App. A at 5)

REASONS FOR GRANTING THE WRIT

1. Issues of public importance are raised by the action of the Court of Claims, disposing of the case in summary fashion in reliance upon the affidavits of defendant's expert and thereby contravening established guidelines concerning the use of the summary judgment procedure:

"Whether the defendant's motion for summary judgment was properly granted with respect to the claims for unauthorized use of the '497 and '842 patents depends upon whether defendant established as a matter of law that these patents were not infringed by the A-10 aircraft. Axiomatically, whether

the A-10 infringed upon these patents could be determined only by a two step process. The first step is to determine the reach of the invention claimed in the patents—in other words, to construe the claims of the patents in the light of all relevant sources of construction. The second step is that of comparing the patented invention, as construed, with the alleged offending device. Autogiro Co. v. United States, 181 Ct. Cl.55, 384 F.2d 391 (1967). In making this analysis a court must also deal with the doctrine of equivalents, under which infringement may be found if two structures perform substantially the same function in substantially the same way to accomplish substantially the same result. E.g., Graver Tank & Mfg. Co. v. Linde Air Products Co., 339 U.S. 605 (1950).

With respect to the first step, petitioners submit that the Court of Claims construction of the patent claims in question

rested upon an erroneous reading of the file wrapper history of the patents in question. The court misconstrued the relation between the concessions made by the inventor and the challenges of the Patent Office examiner. It thus did not accurately determine the essence of what was given up. Cf. Ellipse Corp. v. Ford Motor Co., 452 F.2d 163 (7th Cir. 1971).

A more fundamental error, with farther reaching consequences, was committed by the court in the second step--the comparison of the patent claims against the accused device. In relying completely upon the assertions of the affidavit of defendant's expert, in ignoring the affidavit submitted by petitioners and in failing to heed the urgings of petitioners that the court refuse to permit a trial by affidavit, the court converted the case to a summary proceeding through which petitioners were

denied their right to have the issues determined after presentation of evidence, after the opportunity to challenge the conclusions of defendant's expert through cross-examination and after the opportunity to conduct discovery. This denial, petitioners submit, was a violation of the dictates of Court of Claims Rule 101 and of the commonly accepted federal standards for summary judgment.

The text of Rule 101, dealing with summary judgment, is identical to the text of Rule 56 of the Federal Rules of Civil Procedure. Cases construing Rule 56 recognize the need to protect a party from victimization by summary procedure. Accordingly, the burden is placed upon the party seeking summary judgment to establish the absence of a dispute as to material facts

and courts are cautioned to consider affidavits only for the purpose of determining whether a material dispute exists, lest a trial by affidavit supplant trial on the merits. E.g., Adickes v. S. H. Kress & Co., 398 U.S. 144 (1970); Associated Press v. United States, 326 U.S. 1 (1945); Poller v. Columbia Broadcasting System, Inc., 368 U.S. 464 (1962). These standards have been adopted by the Court of Claims in construing its own rule. E.g., Fix v. United States, 177 Ct. Cl 369, 368 F.2d 609 (1966).

Use of the summary judgment procedure in a complicated patent case involving expert opinions presents special dangers. The absence of the safeguard of cross-examination, by which the basis for the expert's opinion may be probed and the weight to be given his opinion ascertained, has led to a reluctance to base summary judgment upon

the affidavits of experts. E.g., Sartor v. Arkansas Natural Gas Corp., 321 U.S. 620 (1944); Northrop Architectural Systems v. Tripton Manuf. Co., 437 F.2d 889 (9th Cir. 1971). The complex case itself may not be an apt subject for summary disposition. Kennedy v. Silas Mason Co., 334 U.S. 249 (1948).

The Court of Claims violated these essential and salutary standards through its incautious, wholesale reliance upon the affidavits of defendant's expert, Urban A. Hinders. For example, the court commenced its discussion of the application of the '842 patent to the A-10 by observing that the A-10 aircraft has no upwardly open channel formed in the wing. This statement was derived from paragraph 6 of the Hinders affidavit. In making this statement, which effectively disposed of petitioners' contentions insofar as both patents were concerned, the court

completely ignored the assertions of the affidavit submitted by petitioner that the wing structure did form a channel. More importantly, it accepted uncritically the conclusion of defendant's expert, unbuttressed by any facts, upon one of the ultimate facts in issue. Similarly, in assessing the relationship of the elements of the tail structure, the Court adopted as its rationale Mr. Hinders' statement concerning the intended design of the tail structure.

The reliance upon summary procedure in a case such as this one involves dangers over and above those posed in an ordinary case. The motion was filed prior to any opportunity for discovery. Poised against petitioners are the resources of the United States government. The government's expert is thoroughly familiar with the structure of the aircraft; the government has the opportunity to select which data it will

present upon its motion. Petitioners, in contrast, have access only to that data which the government chooses to present. Under such circumstances, petitioners are denied the right to proceed further by a summary procedure in which they may not meaningfully participate.

Petitioners suggest that review of the decision upon the infringement issue is of importance for two reasons. First, the application by the Court of Claims of its summary judgment rule is important in view of the volume of litigation adjudicated by that court involving the procurement by the government of new and important devices. The manner in which these cases are disposed of by the Court of Claims, and the protection of the rights of patentees, have consequence beyond this case. Second, as argued hereinabove, the court has disregarded the

limitations upon the summary judgment procedure developed by this Court. Because of the presence of the summary judgment procedure throughout the federal court system decision upon standards for its use would have application beyond the Court of Claims. Petitioners submit that this Court should grant review to ensure that the substantial rights of persons in their position should not be abrogated through summary procedure not in compliance with the safeguards expressed in numerous decisions by this Court.

2. The opinion in this case is the first judicial construction of 35 USC Section 286 relating to the tolling effect of an administrative claim for compensation.

The Court of Claims held that because the only patents to which specific reference was made in the administrative claim filed with the Air Force were the '497

and '842 patents, no tolling effect could be given with respect to the '262 patent. It rejected petitioners' assertion that the '262 patent was integrally related to the written claim. Instead, relying upon the idea that the purpose of Section 286 was to afford the agency involved the opportunity to correct its mistakes, for which proposition the court cited Fairchild Engine & Airplane Corp. v. United States, 152 Ct. Cl. 352, 285 F.2d 131 (1961), the court held that the claim must be sufficiently detailed to afford the government a realistic opportunity to consider the claim.

The only requirement of Section 286 is that the claim for compensation be in writing. See Saragovitz, Administrative Claims for Patent Infringement, 25 Fed. B. J. 113 (1965). There are no judicially developed standards whatsoever concerning the necessary requisites of an

administrative claim. In essence, the Court of Claims standard permits the government to promulgate its own standards as to the perimeters of a claim which will activate the tolling effect of the statute.

Petitioners submit that this aspect of the case involves important issues because of the fact that there is no judicial construction of the written claim requirement. Moreover, this issue bears upon government procurement and upon the relief to be granted to private parties if the government through this procurement infringes upon patents. For this reason, review is in the public interest.

Petitioners complied fully with Section 286 by the filing of an administrative claim for compensation with the Department of the Air Force on December 21, 1976. All patents in suit, including the '262 patent, relate to enhanced lifting

properties derived from the use of the channel effect in jet propelled aircraft. In this sense, the administrative claim met even the Court of Claims standard of being "sufficiently detailed to afford the government a realistic opportunity to consider and settle the claim." The defendant alleged no reason why the presence vel non of a specific reference to the '262 patent would have made any change in the scope of defendant's investigation. This standard being met there can be no doubt that petitioners have met the more reasonable test which should have been applied in the first instance, namely: by reason of the written claim filed on December 21, 1976, the Air Force knew or reasonably should have known that compensation was sought for infringement of the ideas pertaining to the derivation of enhanced lift from the use of the channel

effect in jet propelled aircraft which were embodied in the A-10.

CONCLUSION

For the reasons stated, it is respectfully prayed that the petition for certiorari be granted.

Respectfully Submitted,

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In the United States Court of Claims

No. 181-78

(Decided May 14, 1980)

WILLARD R. CUSTER AND
CUSTER CHANNEL WING CORPORATION
v. THE UNITED STATES

James J. Nolan, Jr. and *W. Michael Pierson*, for plaintiffs. *Leon H.A. Pierson*, attorney of record.

Joseph A. Hill, with whom was *Assistant Attorney General Alice Daniel*, for defendant. *Thomas L. Kundert*, Department of the Air Force, of counsel.

Before DAVIS, KASHIWA and SMITH, *Judges*.

ON DEFENDANT'S MOTION AND SUPPLEMENTAL MOTION FOR SUMMARY JUDGMENT

PER CURIAM: This case comes before the court on plaintiffs' request, filed October 26, 1979, for review by the court of the recommended decision of Trial Judge Francis C. Browne, filed August 21, 1979, pursuant to Rule 54(b) and the court's order of November 10, 1978, on defendant's motion and supplemental motion for summary judgment, having been submitted on the briefs and oral argument of counsel. Upon consideration thereof, since the court agrees with the

trial judge's recommended decision, as hereinafter set forth, it hereby affirms and adopts the decision as the basis for its judgment in this case. Accordingly, defendant's motions are granted and the petition is dismissed.

OPINION OF TRIAL JUDGE

BROWNE, *Trial Judge:* This is an action brought by Willard R. Custer (Custer) and Custer Channel Wing Corporation (CWC) against the United States (defendant) under 28 U.S.C. § 1498(a) for unauthorized use or manufacture by or for defendant of the inventions disclosed and claimed in United States Patents Nos. 2,687,262 (the '262 patent), 3,704,842 (the '842 patent), and 3,650,497 (the '497 patent).

Defendant has moved for summary judgment based on its contention that recovery under the '262 patent is barred by the statute of limitations and the accused structure does not infringe either the '497 or '842 patent.[1] Plaintiffs contend that defendant's motions are based on erroneous propositions of law and that genuine issues of material fact are in dispute and remain to be decided. For the reasons stated below, we conclude that there are no genuine issues of material fact in dispute and the case may be decided solely on the law as applied to the undisputed facts. On the basis of such facts and the applicable law, we decide that defendant's motion and supplemental motion for summary judgment should be granted and, accordingly, dismiss the petition.

"Channeled Aircraft"

"Channeled Aircraft" or a "Channel Wing Aircraft" is a type of jet propelled aircraft in which either the intake or exhaust air of a jet engine is directed across the upper surface of an upwardly open channel or trough, the longitudinal axis of which extends in the direction of flight. The channel is contoured to function as an airfoil insofar as the speed of the air traveling across the upper surface of the channel, being enhanced by the thrust of the engine, creates

[1] Leave was granted to amend the petition to include a charge of infringement of claim 3 of the '497 patent after defendant had filed its motion for summary judgment. Thereafter, defendant filed its supplemental motion for summary judgment with respect to claim 3 of that patent. This memorandum and opinion, therefore, is dispositive of both the original and supplemental motions.

an upward force in the channel and thus provides lift for the aircraft to which the channel is attached. The net result of such a configuration is the generation of a lifting force in addition to that provided by the wing airfoil of otherwise conventional aircraft.

Each of the patents in suit relates to an aircraft embodying the "channel" concept. The '262 patent is directed to an aircraft in which the inlet of the jet engine is adjacent the leading edge of the channel, and the discharge of the jet engine is intermediate of the fore and aft ends of the channel. The '842 patent is concerned with the contour of the exhaust stack of the jet engine in relation to the contour of the channel, and the position of the exhaust stack in relation to the leading edge of the channel. The '497 patent deals with a further modification of the channel concept in that the channels are located in close proximity to the discharge end of the jet engines in direct line of communication with the exhaust flow and are vertically adjustable in such a way as to function as ailerons.

Although Custer is the inventor of the invention claimed in each of the patents, he assigned his entire right, title and interest in the '497 patent to co-plaintiff, CWC, but retained title to the '262 and '842 patents. Thus, Custer is plaintiff as to the '262 and '842 patents, and CWC is plaintiff as to the '497 patent.

The '262 Patent

The '262 patent, issued August 24, 1954 to Willard R. Custer, is entitled "Jet Propelled Channeled Aircraft." It is undisputed that Custer is the sole party entitled to recovery for infringement of the '262 patent,[2] if any, inasmuch as the patent was not assigned by him to any other party. 35 U.S.C. § 151.

The '262 patent expired on August 24, 1971, the term of the patent being 17 years from the date of issue. 35 U.S.C. § 154. Custer can recover only for acts of infringement committed after the date of issue and prior to the date of expiration of

[2] In an amended petition filed by plaintiffs on January 12, 1979, Custer asserted ownership of the '262 patent and entitlement to any and all recovery for its infringement. Defendant in its answer filed February 23, 1979, did not traverse this assertion.

the patent, subject to the statute of limitations prescribed by 28 U.S.C. § 2501 and 35 U.S.C. § 286. *Calhoun v. United States*, 197 Ct. Cl. 41, 45, 453 F.2d 1385, 1387, 172 USPQ 438, 440 (1972); *Hebern v. United States*, 132 Ct. Cl. 344, 348, 132 F. Supp. 451, 453, 105 USPQ 478, 479 (1955). Whereas 28 U.S.C. § 2501 requires suit to be brought within 6 years after the claim "first accrues," 35 U.S.C. § 286 extends the time for bringing suit for a period equal to the time an administrative claim was pending before a department or agency of the Government prior to the date of filing the petition.

The petition in this case was filed on April 27, 1978. Thus, recovery is limited to the period subsequent to April 27, 1972, unless an administrative claim was filed with respect to the patent in suit. Inasmuch as the patent expired on August 24, 1971, no recovery whatever may be had unless the 6-year statute of limitations has been tolled.

Custer argues that an administrave claim was filed on December 21, 1976, thereby tolling the statute of limitations for a period from December 21, 1976 to February 16, 1978, the date on which the claim was denied.

The only evidence relied upon by Custer to establish the filing of an administrative claim with respect to the '262 patent is a letter written by his attorney, Mr. Pierson, on December 21, 1976, to Mr. Joseph E. Rusz, an Air Force patent attorney, which stated:

> Dear Mr. Rusz:
>
> I enclose for filing Administrative Claim of Willard R. Custer for infringement of patents owned by him *all as set out in the enclosed letter signed by Mr. Custer*. (Emphasis added.)
>
> * * * * *
>
> The enclosed letter stated:
>
> Dear Mr. Rusz:
>
> I desire to file an administrative claim for compensation before the Department of the Air Force for infringement of my patents by Fairchild Industries, Inc.
>
> * * * * *
>
> The patents infringed are patents numbers 3,650,497-Claim No. 1, and 3,704,842-Claim No. 1.
>
> * * * * *

Since this letter does not mention the '262 patent, Custer's contention is unsupported by the evidence. Custer's argument is to the effect that the letter and enclosures were sufficient to constitute a claim for infringement of the '262 patent within the meaning of 35 U.S.C. § 286, because the patents which were enumerated in the letter were closely related in subject matter to the '262 patent, and because the "existing law is extremely vague as to the necessary requisites of an administrative claim."

The tolling provisions of 35 U.S.C. § 286 are designed to afford the proper Government agency "the opportunity of correcting its mistakes after due deliberation" as an alternative to defending a costly law suit in court. *See Fairchild Engine & Airplane Corp. v. United States*, 152 Ct. Cl. 352, 285 F.2d 131, 128 USPQ 153 (1961). In exchange for this benefit to the Government, the patent owner's right to recover against the Government for infringement is extended beyond the normal statutory limit of 6 years.

In determining the applicability of the tolling provision of 35 U.S.C. § 286, therefore, the decisive question is whether the patent owner's notice to the Government of its claim for infringement is sufficiently detailed to afford the Government a *realistic* opportunity to consider and settle the claim.

Applying this rule to the facts of this case, it is clear that the notice sent to the Government made no reference, express or implied, to a claim for infringement of the '262 patent. Moreover, the language in the cover letter states that the infringed patents are "all as set out in the enclosed letter," thereby foreclosing any reasonable possibility that patents beyond the two expressly mentioned were being asserted as infringed.[3] To say that this was sufficient to serve as a claim for infringement of the '262 patent merely because the '262 patent is directed to subject matter related to that disclosed in the asserted patents, is to impute to the document a competence which it does not possess.

Custer, relying principally upon *Japanese War Notes Claims Assn. v. United States*, 178 Ct. Cl. 630, 373 F.2d 356, *cert. denied*, 389 U.S. 971 (1967), and *Spevack v. United States*, 182 Ct. Cl. 884, 889–90, 390 F.2d 977, 981 (1968), also asserts

[3] It is also noted that, in each case, the specific claim of each patent asserted identified the claim alleged to infringe. Even if the '262 patent was impliedly asserted, no specific claim was identified as being infringed.

that the statute of limitations is tolled if it can be shown that the Government concealed its infringement of the '262 patent. Custer, however, has not alleged any facts which would established concealment or inherently undiscoverable activity on the part of defendant. A mere lack of knowledge of the existence of facts which constitute a cause of action will not postpone the operation of the statute of limitations. *Thomas v. United States*, 125 Ct. Cl. 76, 80 (1953); *Dion v. United States*, 137 Ct. Cl. 166, 167 (1956). Custer merely surmises that *future* discovery *might* reveal such evidence.

In response to this assertion, defendant has filed the affidavit of Mr. Urban A. Hinders, the chief engineer responsible for the development of the accused A-10 aircraft, which states that, with the exception of certain internal details relating to survivability and vulnerability of the aircraft, neither the accused aircraft nor the contracts under which they were procured were ever classified. Moreover, the affidavits offered by defendant clearly establish that no A-10 aircraft was accepted by the Government or even assembled prior to the expiration date of the '262 patent.[4] Custer has not challenged the accuracy of this affidavit; wherefore its accuracy is deemed admitted. *See First National Bank v. Cities Service Co.*, 391 U.S. 253 (1968). Mere speculation as to the *possible* existence of facts which *might* toll the statute of limitations is not sufficient to give rise to a genuine issue of material fact. *See Reynolds v. Needle*, 132 F.2d 161, 162 (D.C. Cir. 1942); *Carroll v. Pittsburgh Steel Co.*, 103 F. Supp. 788, 790 (W.D. Penn. 1952).

We conclude that there was no administrative claim for infringement of the '262 patent which could be relied upon to toll the 6-year statute of limitations. Having concluded that the statute has not been tolled and the patent having expired more than 6 years prior to the filing of the petition, the claim as to the '262 patent is barred by the statute and the petition must be dismissed as to that patent.

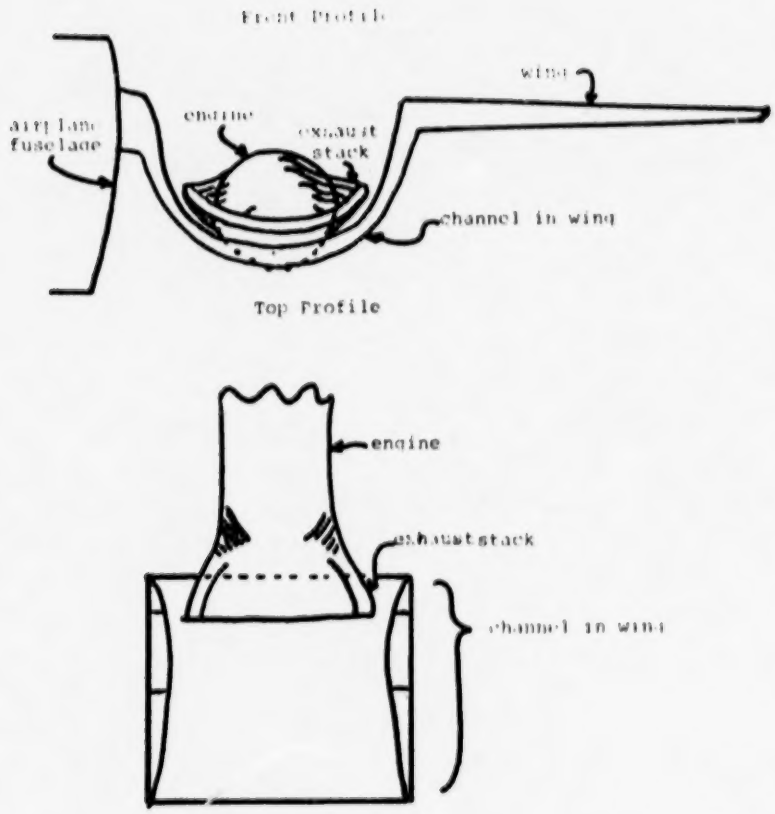
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[4] Although it is true that a contract for two of the accused structures was executed prior to the date of expiration of the patent, this court has recently held that liability for infringement accrues on the date of *delivery* of the device, not on the date of execution of the contract for the device. *See Leesona Corp. v. United States*, 220 Ct. Cl. ____, 599 F.2d 958, 202 USPQ 424, *cert. denied*, ____ U.S. ____ (1979).

The '842 Patent

The '842 patent, issued on December 5, 1972, is entitled "Contoured Stack of Jet Engine With Channel Wing Aircraft." The patent is presently in force and will not expire until 1989. Custer, as sole owner of the '842 patent, is the only party entitled to recover for its infringement, if any. 35 U.S.C. § 151.

The '842 patent is directed to a channel wing aircraft in which a channel is located in each wing of the aircraft and the discharge end of the exhaust stack of the jet engine disposed in each of the channels is positioned slightly above and aft of the leading edge of the channel. The exhaust stack is flattened and concavely contoured so as to expel a flattened and contoured stream of air across and immediately above the surface of the open channel. The following drawings illustrate a preferred embodiment of this structure:



Preferred Embodiment Of The '842 Patented Invention

The Claim

Claim 1, the only claim in the patent, recites:

1. In an aircraft having an upwardly open lift channel extending generally longitudinally of the aircraft, and a jet engine for inducing air flow in said channel in a rearward direction, wherein said upwardly open channel is formed in the wing of said aircraft and extends across said wing from the leading to the trailing edge thereof;

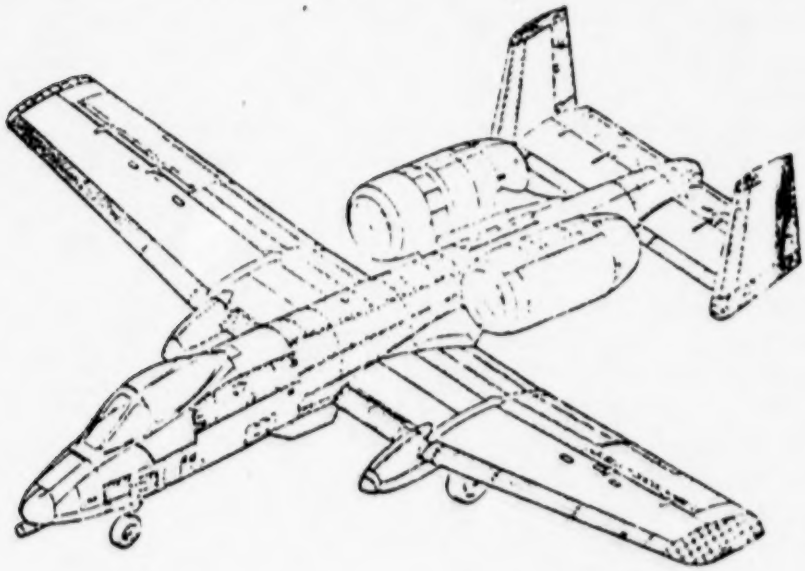
a. said jet engine being mounted on the aircraft and the discharge end of the engine exhaust stack being disposed adjacent to and a short distance above the leading edge of the open channel;

b. said exhaust being contoured at the discharge end thereof as an elongated, flattened, channel-shaped discharge opening;
c. said discharge opening being directed substantially parallel to the surface of said open channel and rearwardly thereof for discharging all of the jet engine exhaust into said open channel adjacent to and a short distance above the leading edge thereof as a flattened, high speed stream of hot gases substantially parallel to the channel surface to provide a lift effect.

* * * * *

Application of the Claim to A-10 Aircraft

The accused structure is an aircraft identified by the Air Force as the A-10. The basic configuration of the A-10 is shown in the sketch below:



It is readily apparent from the illustration that the A-10 aircraft does not have an "upwardly open channel * * * formed in the wing" as required by Claim 1. Moreover, the exhaust stacks of the A-10 jet engines are neither flattened nor contoured.

It is Custer's position that the entire *tail structure* of the aircraft (the combination of the tail surface, elevators,

stabilizers and rudders) constitutes an "upwardly open channel" into which the exhaust of the engines is discharged "a short distance above the leading edge" of the tail surface. Custer contends that it is not necessary that the channel be formed in the wing or that the exhaust stacks be flattened or contoured to conform to the configuration of the channel.

Defendant maintains that the tail structure of the A-10 does not generate any additional lift force in combination with the engines, since the exhaust from the engines is not even directed across the surface of the tail structure. Custer refutes this contention with an affidavit to the effect that the exhaust from the A-10 engines is sufficiently close to the upper surfaces of the tail structure to create a lifting effect. Whether or not a lifting effect is produced, however, is not a genuine issue of material fact, since the *structure* and *relationship of elements* of the asserted claim are not to be found in the A-10 aircraft.

Thus, in the present case, even assuming, *arguendo*, that additional lift *is* produced in the *tail* structure, the question still remains whether the absence of a *flattened and contoured exhaust stack* in the engines of the A-10 aircraft and the absence of channels *in the wings* of the aircraft is sufficient to avoid infringement of the '842 patent claim, as a matter of law.

Custer asserts that even though the elements of the A 10 aircraft do not correspond to the language of the '842 patent claim, the channel formed by the elements of the tail structure in the A-10 aircraft meets the terms of the claim in substance because the channel thus formed performs substantially the same function as the wing channel defined by the claim, in substantially the same way, to accomplish substantially the same result. In other words, Custer contends he has satisfied the requirements of the judicially created doctrine of equivalents. *See, e.g., Graver Tank & Manufacturing Co. v. Linde Air Products Co.*, 339 U.S. 605 (1950).

The file wrapper of the '842 patent, however, estops Custer from invoking the doctrine of equivalents since the claim was allowed over the prior art *only* after the applicant amended the antecedent claim[5] to specifically limit the location of the

[5] Technically, the '842 patent claim was not the result of an amendment to a previously rejected claim. Rather, after rejection of the prior claim, applicant cancelled

Cont.

channel by providing that the "open channel is formed *in the wing* of said aircraft and *extends across said wing* from the leading to the trailing edge thereof." (Emphasis added.) Since the location of the channel in the *wing* of the aircraft was a prerequisite to the allowance of the claim of the '842 patent, the doctrine of equivalents may not be used to broaden the scope of the claim beyond its literal meaning. *See, e.g., Graver Tank & Manufacturing Co. v. Linde Air Products Co., supra.* Thus, the claim cannot be read on an aircraft in which the channel, if there be one, is located in the *tail* of the aircraft. In other words, a patentee may not broaden the interpretation of a claim to encompass that which he gave up by a limiting amendment which enabled him to receive a patent. *See, e.g., Christopher J. Foster, Inc.* v. *Newport News Shipbuilding and Dry Dock Co.*, 187 USPQ 733 (4th Cir. 1975). The A-10 aircraft does not infringe the claim in suit either in literal terms or by application of the doctrine of equivalents since both the literal terms and the reasonable equivalents of the claim are limited to location of the channel in the wing.

Even if the claim was not limited in substance, the combination of the jet engine and tail structure, disposed in the configuration shown above, will not accomplish the same result as the arrangement claimed and shown in the drawings of the patent in suit. The primary purpose of passing the exhaust from the jet engine over the upwardly open channel formed in the *wing* of the aircraft is to enhance the stability of the aircraft during takeoff and landing, since during these times the speed of the aircraft is so low that the lift normally generated is barely sufficient to sustain aircraft maneuvers in a safe and controllable manner. *See* U.S. Patent No. 2,611,555, col. 1, lines 1-33, (which patent is incorporated by reference in the '842 patent at col. 4, line 11). If the tail structure is employed as a lift-generating channel in the A-10 aircraft as contended by Custer, the result will be the opposite of that obtained when the channel is formed in the wing. According to the unrefuted affidavit of Mr. Hinders, an aeronautical engineer and chief engineer on the Air Force A-10 program:

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it and added the '842 patent claim. However, inasmuch as the substance of the newly added claim was identical to the previously rejected claim (with the exception of the language quoted in the text above), we have deemed it appropriate to analyze it as an amended claim.

> * * * tail lift would [be] a function of the engine thrust varying with the power setting of the engine. Thus, as power is applied for takeoff or reduced for landing, the lift on the tail would be changed. This is extremely undesirable during the critical takeoff and landing phases of aircraft flight since it would require pilot action to counter this effect either by control inputs or by retrimming the aircraft control.

The undisputed evidence of record, therefore, establishes that the A-10 structure is not the functional equivalent of the structure defined by the claim.

The absence of a contoured exhaust stack in the A-10 jet engines is, by itself, fatal to Custer's infringement claim. Throughout the prosecution of the '842 patent, Custer repeatedly emphasized the importance of contouring the exhaust stack so as to produce a high speed stream of hot gas and represented to the Patent Office that the stack design was an "essential" feature of his invention. Even the title of the patent, "Contoured Stack of Jet Engine With Channel Wing Aircraft," reflects the importance of this feature. While other features recited in the claim may also be "essential" to produce the result intended by Custer, the other features are not relied upon to distinguish the claim from the prior art. Whether an allowable claim could have been drawn to cover the A-10 structure is irrelevant. The question is not what the applicant *might have* claimed, but what he *has* claimed. *Lewis v. Pennsylvania Steel Co.*, 59 F. 129 (3d Cir. 1893). Accordingly, for this and the other reasons stated above, it is concluded that the A-10 aircraft does not infringe the '842 patent claim as a matter of law. Accordingly, defendant's motion for summary judgment of noninfringement of the Custer '842 patent is granted and the petition must be dismissed as to that patent.

The '497 Patent

The '497 patent, issued on March 21, 1972, is entitled "Jet Propelled Channeled Aircraft." This patent is still in force and will not expire until 1989. CWC, as assignee and sole owner of the '497 patent, is the only party who was or is now entitled to recovery for its infringement, if any. 35 U.S.C. § § 152, 261.

A. *Statute of Limitations*

Custer erroneously alleged ownership of the '497 patent in the original petition (filed April 27, 1978), CWC not having been named as a party plaintiff at that time. Leave to amend the petition was granted to allow CWC to appear as a co-plaintiff and plaintiffs were permitted to amend the allegations of ownership of the respective patents. The amended petition was filed on January 12, 1979. Amendment of the petition by adding a new party to the petition does not, as to the added party, relate back to the date of filing the original petition. *See Marlowe v. Fisher Body*, 489 F.2d 1057, 1064 (6th Cir. 1973). Accordingly, the 6-year statute of limitations established by 28 U.S.C. § 2501 and the extension thereof afforded by 35 U.S.C. § 286 is to be measured from the date of filing of the amended petition on January 12, 1979 as to CWC and the '497 patent.

Although a claim may be said to have "first accrued" when the first A-10 aircraft was delivered to defendant, each succeeding delivery would give rise to a new claim. Thus, the statute of limitations would bar recovery only as to A-10 aircraft either delivered *or used* within 6 years of the date of filing the amended petition, namely, since January 12, 1973. *See Irving Air Chute v. United States*, 117 Ct. Cl. 799, 93 F. Supp. 633 (1950). Although an administrative claim for compensation for infringement of the '497 patent was filed, it was not filed by CWC, the sole lawful owner of the '497 patent. 35 U.S.C. § 286 allows for an extension of the 6-year statute of limitations, its purpose being to afford the Government an opportunity to correct its mistakes as an alternative to costly litigation. *See Fairchild Engine & Airplane Corp. v. United States*, 152 Ct. Cl. 352, 285 F.2d 131, 128 USPQ 153 (1961). A claim filed by one not the lawful owner of the claim clearly cannot ever achieve this purpose. Accordingly, the filing of the administrative claim solely by and on behalf of Custer cannot serve to extend CWC's period of recovery.

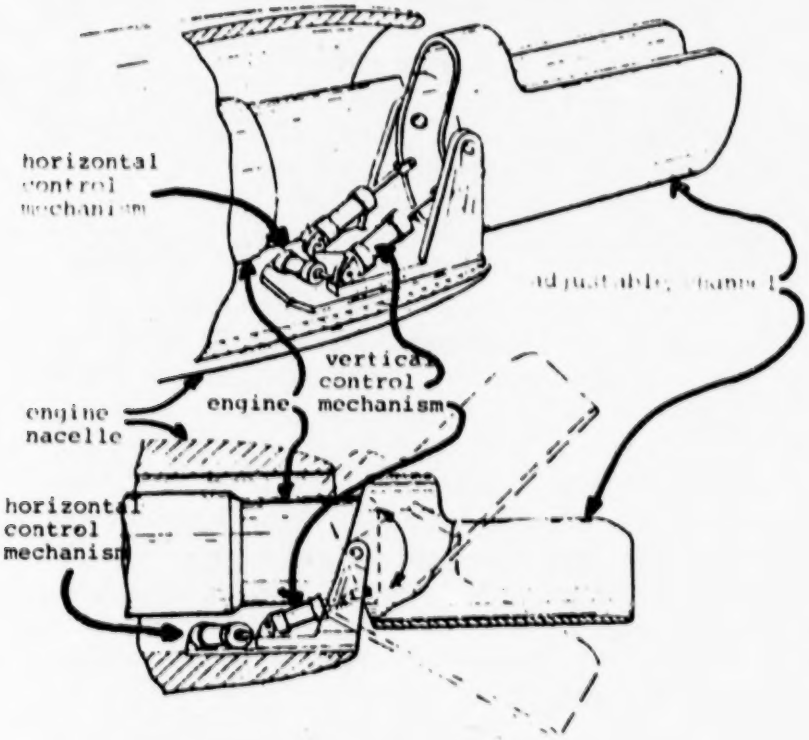
B. *Infringement*

Although recovery may not be had by CWC for any A-10 aircraft delivered to or used by defendant prior to January

12, 1973, the issue of infringement will be determined in the event any such aircraft have been delivered to or first used by defendant after January 12, 1973.

The '497 patent, essentially, relates to an aircraft in which the engines are provided with vertically and horizontally adjustable "channels" associated with the engines in such a manner as to function as ailerons.

The following drawings are annotated reproductions of figures 5 and 6 of the patent and illustrate the preferred embodiment of the invention claimed in the '497 patent.



Preferred Embodiment Of
The '497 Patented Invention

CWC asserts that the A–10 aircraft infringes claims 1 and 3 of the '497 patent. Claim 1 is an independent claim, while claim 3 depends upon claim 2 which, in turn, is dependent upon claim 1. Claim 1 of the patent provides:

1. In a jet propelled aircraft having a fuselage, wings, and jet engines operatively mounted on said wings on

opposite sides of said fuselage in laterally space relation thereto, the improvement comprising:

a. airlerons consisting of an aft upwardly open lift channel affixed to each of said jet engines in close proximity to the discharge end thereof, and in direct line of communication with exhaust flow therefrom;
b. means mounting said channels with respect to said engines for vertical angular adjustment with respect to said engine and the exhaust flow therefrom; and
c. means operable to selectively implement the angular adjustment, said channels constituting vertical lift surfaces normal to the longitudinal axis thereof, whereby, through lift created thereby due to exhaust gas flow therethrough, upon angular adjustment, function as ailerons to steer said aircraft at slow speeds.

* * * * *

It is immediately apparent from an examination of the structure of the A–10 aircraft (*see* sketeh, *supra*, at p. 9) that it does not literally respond to a number of limitations present in claim 1. The A–10 engines are not "mounted on [the] wings"; they are mounted on the fuselage. There does not appear to be an "aft upwardly open lift channel *affixed* to each of [the] jet engines." (Emphasis added.) To the extent that the tail structure of the A–10 is purported to constitute the "channel," it is not *affixed* to the engines. There are no "means mounting [any] channels * * * for vertical angular adjustment." Again, to the extent that the A–10 tail structure is purported to constitute a "channel," only the rudders and elevators are horizontally or vertically adjustable and they do not function as ailerons.[6] Neither does there appear to be any "means operable to selectively implement [an] angular adjustment" of the tail structure in the manner contemplated by Custer.

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[6] One of the affidavits submitted by plaintiffs states that "the wing [of the A 10] contains a large *adjustable* flap which may be extended from the trailing edge of the wing an estimated distance of at least eighteen inches and which increases the surface of the wing until the trailing edge of the flap extends longitudinally to a distance well behind and under the throat of the engine. * * * Use of these flaps at low speeds will enhance the channel effect when it is most needed, that is, during takeoff, landing and slow flight maneuvers." (Emphasis added.) The affidavit does not state, however, that this flap is adjustable for *vertical angular* movement or horizontal movement *normal to the direction of flight*, nor do we interpret the quoted language to suggest that either is the case. Rather, the statement is interpreted as meaning only that the flap is adjustable in a horizontal *plane* substantially parallel to the direction of flight. Accordingly, we conclude for purposes of these motions that the A–10 aircraft does not have a channel capable of *vertical angular* movement.

When the '497 application was filed, the following independent claim was presented:

> 1. In jet propelled aircraft including at least one jet engine longitudinally disposed therewith, an upwardly opening lift channel affixed to said jet engine and with an end thereof in close proximity to a fluid flow opening of said jet engine.

This very broad claim was rejected (along with the remaining dependent claims) as being fully anticipated by the prior art. In response to the examiner's rejection, claim 1 was cancelled and the following claim substituted:

> 25. In a jet propelled aircraft having a fuselage and a wing, the improvement comprising:
>
> a) jet engines operatively mounted on said wings on opposite sides of said fuselage in laterally spaced relation thereto;
>
> b) an aft upwardly open lift channel affixed to each of said jet engines in close proximity to the discharge end thereof, and in direct line of communication with exhaust flow therefrom;
>
> c) means mounting said channels with respect to said engines for vertical angular adjustment with respect to said engine and the exhaust flow therefrom; and
>
> d) means operable to selectively implement the angular adjustment, whereby said channels through lift created thereby due to exhaust gas flow therethrough function as ailerons to steer said aircraft at slow speeds.

Among the arguments offered by the applicant for allowance of the substituted claim was that the vertically adjustable channels "at the trailing edge of each engine • • • function as ailerons to lift the wing up or down," and that when "you deflect the channel downward, the aircraft would rise from the reaction of the atmospheric pressure • • • and not from the deflection of the gases which had passed through the channel." The examiner, however, was not persuaded and again rejected all of the claims, including the newly added claim 25, pointing out to the applicant that the prior art "discloses [among other things] a vertically and horizontally movable aft channel."

A conference was then held between the applicant's attorney and the examiner. Subsequently, an amendment was filed which cancelled claim 25 and substituted the following claim:

29. In a jet propelled aircraft having a fuselage, wings, and jet engines operatively mounted on said wings on opposite sides of said fuselage in laterally spaced relation thereto, the improvement comprising:

a) ailerons consisting of an aft upwardly open lift channel affixed to each of said jet engines in close proximity to the discharge end thereof, and in direct line of communication with exhaust flow therefrom;
b) means mounting said channels with respect to said engines for vertical angular adjustment with respect to said engine and the exhaust flow therefrom; and
c) means operable to selectively implement the angular adjustment, said channels constituting vertical lift surfaces normal to the longitudinal axis thereof, whereby, through lift created thereby due to exhaust gas flow therethrough, upon angular adjustment, function as ailerons to steer said aircraft at slow speeds.

As is obvious from a comparison of the language of newly added claim 29 and previously rejected claim 25, the sole substantive difference between the two claims is the presence in claim 29 of the words "ailerons[7] consisting of" to describe the upwardly open lift channel. In the remarks which accompanied the amendment, the applicant at no point argued that the examiner's previous rejection of claim 25 was erroneous. Instead, the applicant repeatedly emphasized the importance of "ailerons," the newly added claim language:

> *As discussed during the conference, none of the patents of record show or teach the use of Custer channels as ailerons.* Also as pointed out, the principle of the Custer channel is the creation of lift forces normal to the longitudinal axis of the channel which is a highly effective factor at low speed operation of aircraft. The use of this principle for aileron or roll control of aircraft is certainly not taught [in the prior art] patents. *In [a prior art patent] * * * [n]o control is taught or suggested * * *.*
>
> *[In another prior art patent,] * * * there is no teaching or suggestion of roll control by means of ailerons in the nature of Custer channels.*

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[7] Webster's New World Dictionary (1968 ed.) contains the following definition of an aileron: "n. a movable hinged section of the wing of an airplane, *for banking in turns.*" (Emphasis added.) The patent specification also mentions these ailerons in a manner consistent with this definition: "Aft channels, if used on the outboard engines, can be so oppositely adjustably controlled, if desired, as to replace or work in conjunction with standard ailerons in an obvious manner, and this would create positive and high efficiency lateral control for the aircraft." Col. 2, lines 61–65.

> The present application shows the channels fore and aft of a jet engine. *This is a different structure from the prior [art] patents where the channels are a stationary part of a nacelle and fuselage and not a part of the engine structure.* * * * *The control factor imparted to the aircraft by use of this principle of the Custer channel used as ailerons at very low speeds is of extreme significance. In low speed or under conditions proximating a stall, the availability of roll control is very important.* At the same time, the lift contributed by the Custer channels at the leading edge of the wing is of importance in maintaining the aircraft at slow speeds, such as when the entire wing has stalled.
>
> * * * *[Another prior art patent] obviously does not teach the use of adjustable channels*, and, therefore, adds nothing to the disclosures of [other prior art] in suggesting or teaching the present invention.
>
> For the foregoing reasons, claim 29 is urged as being presently allowable. [Emphasis added.]

Claim 29 was then allowed as presented and became claim 1 of the patent.

The prosecution history clearly demonstrates that the inclusion of language defining the vertically adjustable open channel as the equivalent of an aileron to provide *roll control* was essential to allowance of the claim. Not only was the "aileron" limitation the sole difference between the allowed claim and the previously rejected claim, but also in the remarks which accompanied the amendment in which the claim was present, the applicant repeatedly represented to the Patent Office that this special type of aileron was not disclosed in the prior art and that this difference was of "extreme significance." To accept CWC's argument now that the A-10 structure infringes claim 1 (even though it admittedly lacks a vertically adjustable open channel functioning as an aileron) would require this court to eliminate from the claim the very limitation upon which its allowance was predicated. Although the doctrine of equivalents may be used to enlarge the scope of a claim beyond its literal meaning, *see, e.g., Graver Tank & Manufacturing Co. v. Linde Air Products Co.*, 339 U.S. 605 (1950), as we have previously pointed out, this doctrine cannot be used to broaden the scope of the claim to encompass subject matter which the applicant expressly surrendered by a limiting amendment in order to obtain allowance of the claim. *See, e.g., Christopher J. Foster, Inc. v. Newport News Shipbuilding and Dry Dock Co.*, 187 USPQ 733

(4th Cir. 1975). Thus, the absence of a vertically adjustable open channel *functioning as an aileron* in the A–10 aircraft, as a matter of fact, leads to the conclusion that, as a matter of law, plaintiffs' claim is not infringed. Since the remaining asserted claim, *i.e.*, claim 3, is dependent from claim 1, it follows, as a matter of law, that it likewise is not infringed by the A–10 aircraft structure. *Teledyne McCormick Selph v. United States*, 214 Ct. Cl. 672, 558 F.2d 1000, 195 USPQ 261 (1977); *Dresser Industries, Inc. v. United States*, 193 Ct. Cl. 140, 432 F.2d 787, 167 USPQ 473 (1970). In view of the foregoing, there being no dispute as to any genuine issue of material fact, defendant is entitled to judgment on its motion and supplemental motion for summary judgment for noninfringement of the '497 patent as a matter of law.

SUMMARY AND CONCLUSION

Based on the material facts of record, none of which are subject to dispute, we conclude as a matter of law that defendant's accused A–10 aircraft does not infringe the asserted claims in either the '497 or '842 patents, and that recovery for infringement of the '262 patent is barred by the statute of limitations. Accordingly, defendant's motion and supplemental motion for summary judgment are granted and the petition is dismissed.

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APPENDIX B

Court of Claims Rule 101:

Summary Judgment

(a) For Claimant. Subject to the provisions of paragraph (c) of this rule, a party seeking to recover upon a claim or counterclaim may, at any time after a responsive pleading or a dispositive motion has been filed by the adverse party, move with or without supporting affidavits for summary judgment in his favor upon all or any part thereof.

(b) For Defending Party. Subject to the provisions of paragraph (c) of this rule, a party against whom a claim or counterclaim is asserted may at any time move with or without supporting affidavits for summary judgment in his favor as to all or any part thereof.

(c) When Leave is Required. A motion for summary judgment may not be

filed by any party except by leave of court (or the trial judge) (1) after the case has been set for trial, or (2) after the filing of a pretrial memorandum or order in accordance with Rule 113, or (3) after the filing of his response to a dispositive motion by an adverse party, or (4) after the filing of a stipulation of facts by the parties (With respect to a stipulation agreed by the parties to contain all the pertinent facts, see Rule 134(b).)

(d) Motion and Proceedings Thereon. After a motion for summary judgment has been filed, and after the expiration of the time allowed for a response thereto or for a reply to the response, if any (Rule 52(b)) such motion may (subject to the provisions of Rules 54(b), 146(b)(2), and 166(b)) be assigned to the calendar. (See Rule 14(b)(2).)

The judgment sought shall be rendered if the pleadings, depositions, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law. A summary judgment may be rendered on the issue of liability alone although there is a genuine issue as to the amount of damages.

(e) Case Not Fully Adjudicated on Motion. If, on motion under this rule,judgment is not rendered upon the whole case or for all the relief asked and a trial is necessary, the court may ascertain (if it is practicable to do so upon the basis of examining the pleadings and the evidence before it and interrogating counsel) what material facts exist without substantial controversy and what material facts are in good faith controverted. It shall thereupon make an order specifying the facts that appear to be without substantial

controversy (including the extent to which the amount of damages or other relief is not in controversy), and directing such further proceedings in the action as are just. Upon the trial of the action, the facts so specified shall be deemed to be established, and the trial shall be conducted accordingly.

(f) Form of Affidavits: Further Testimony. Supporting and opposing affidavits shall be made on personal knowledge, shall set forth such facts as would be admissible in evidence, and shall show affirmatively that the affiant is competent to testify to the matters stated therein. Sworn or certified copies of all papers or parts thereof referred to in an affidavit shall be attached thereto or served therewith. The court may permit affidavits to be supplemented or opposed by depositions or by further affidavits. When a motion for summary judgment is made and supported as provided in

this rule, an adverse party may not rest upon the mere allegations or denials of his pleadings, but his response, by affidavits or as otherwise provided in this rule, must set forth specific facts showing that there is a genuine issue for trial. If he does not so respond, summary judgment, if appropriate, will be entered against him.

(g) When Affidavits are Unavailable. Should it appear from the affidavit of a party opposing the motion that he cannot, for reasons stated, present by affidavit facts essential to justify his opposition, the court may deny the motion for summary judgment, or may order a continuance to permit affidavits to be obtained or depositions to be taken or discovery to be had, or may make such other order as is just.

(h) Affidavits Made in Bad Faith. Should it appear to the satisfaction of the court at any time that any of the

affidavits presented pursuant to this rule are presented in bad faith or solely for the purpose of delay, the offending party or attorney may be adjudged guilty of contempt.

35 USC Section 286:

Time limitation on damages

Except as otherwise provided by law, no recovery shall be had for any infringement committed more than six years prior to the filing of the complaint or counterclaim for infringement in the action.

In the case of claims against the United States Government for use of a patented invention, the period before bringing suit, up to six years, between the date of receipt of a written claim for compensation by the department or agency of the Government having authority to settle such claim, and the date of mailing by the Government of a notice to the claimant that his claim has been denied shall

not be counted as part of the period referred to in the preceding paragraph.

28 USC Section 2501:

Time for filing suit

Every claim of which the Court of Claims has jurisdiction shall be barred unless the petition thereon is filed within six years after such claim first accrues.

Every claim under section 1497 of this title shall be barred unless the petition thereon is filed within two years after the termination of the river and harbor improvements operations on which the claim is based.

A petition on the claim of a person under legal disability or beyond the seas at the time the claim accrues may be filed within three years after the disability ceases.

A suit for the fees of an officer of the United States shall not be filed until his

account for such fees has been finally acted upon, unless the General Accounting Office fails to act within six months after receiving the account.

APPENDIX C

Excerpt from Affidavit of Urban Hinders:

6. I have examined US Patent 3,704,842 and have become familiar with the structure recited in the single claim thereof and have observed that on the A-10 aircraft:

A. There are no upwardly open channels extending longitudinally from the leading to the trailing edge of the wing. This is readily noted in the plan view of the "Three Views" document.

B. The exhaust of the engine is not induced to flow in any channel.

C. The exhaust of the engine is neither adjacent to nor a short distance above any leading edge - as stated before in paragraph 4.B. above, the exhaust is spatially positioned 3 feet (i.e. 37.9 inches) in front of and nearly 3-1/2 feet (41.5 inches) above the leading edge of the horizontal tail.

D. The engine discharge end is circular and not contoured to form an elongated, falttened and channel-shaped discharge opening.

E. There is no exhaust discharge opening that is substantially parallel to and rearwardly of the surface of any open channel for the purpose of discharging all exhaust gases into a channel as a flattened high speed stream to provide lift. In fact, the structure is the opposite - i.e., the passage of high speed exhaust gases over aerodynamic lift surfaces is to be avoided as set forth in paragraph 5.B, 5.C and 5.D above.

7. I have examined US Patent 3,650,497 and have become familiar with the statements recited in parent claim 1 thereof and have observed that on the A-10 aircraft:

A. The ailerons do not contain any aft upwardly open lift channels and are

not affixed to the discharge end of the engines. The ailerons used are of a conventional configuration and location (i.e. a long rectangular shape in the plan view positioned short of the outboard end of the trailing edge of the wings). Note the plan view of the "Three Views" document.

B. Since there are no channels located at the discharge end of the engine, there are no structures for angular adjustment of the exhaust flow. It is again noted that the exhaust flow has a fixed canter of nearly 5° (i.e. $4^{o}55'45"$).

Excerpt from Affidavit of Willard R. Custer:

3. The placement of the throat of each engine of the A-10 over the trailing edge of the wing induces a rapid fluid flow across the wing from the leading edge to the trailing edge of the wing due to the rapid intake of air into the throat of the engine when the

engine is operated. This effect is created whenever the engine is operated regardless of whether or not the aircraft is in motion. The result of this fluid flow is to generate lift by reason of the reduction of pressure on the upper surface of the wing as a result of the greater velocity over the upper surface. This effect occurs notwithstanding the fact that the trailing edge of the wing is spacially located some small distance below the throat of the engine.

4. Moreover, not illustrated upon the documents submitted by defendant is the fact that the wing contains a large adjustable flap which may be extended from the trailing edge of the wing an estimated distance of at least eighteen inches and which increases the surface of the wing until the trailing edge of the flap extends longitudinally to a distance well behind and under the throat of the engine. The extension of this flap enhances

the lifting principal referred to in paragraph 3 above. Use of these flaps at low speeds will enhance the channel effect when it is most needed, that is, during takeoff, landing and slow flight maneuvers.

5. The location of each engine of the aircraft adjacent to the fuselage and the dihedral shape of the wing (the angulation as it extends from the root section to the tip) creates a rudimentary channel and channels the fluid flow into a space above the wing in front of the throat of the engine. This channel is composed of the side of the fuselage, the upper surface of the wing and the dihedral of the wing. Moreover, between the trailing edge of the wing and the fuselage there is a fairing, or curve section, which completes the channel on one side and assists in directing air to the throat of the engine.

7. Notwithstanding the 5% upward canter of the exhaust flow from the exhaust

nozzles of the A-10 aircraft, the flow created by the exhaust above the upper surface of the horizontal stabilizer (empennage) will induce a reduction of pressure sufficient to create the aforesaid lifting effect. Notwithstanding the aforesaid canter, the blast created by the exhaust is sufficiently close, vertically and parallel, to the horizontal stabilizer to wash or create an area of lowered pressure above this surface. In addition, the vertical stabilizers which form a part of the empennage help to induce a channel effect by directing the fluid flow.

8. Operation of one engine of the A-10 aircraft at a higher r.p.m. than the other could be used to produce and control a roll effect by reason of the channel phenomenon hereinabove referred to, with or without the use of the defendant's ailerons.